a

this is a highly scientific paper

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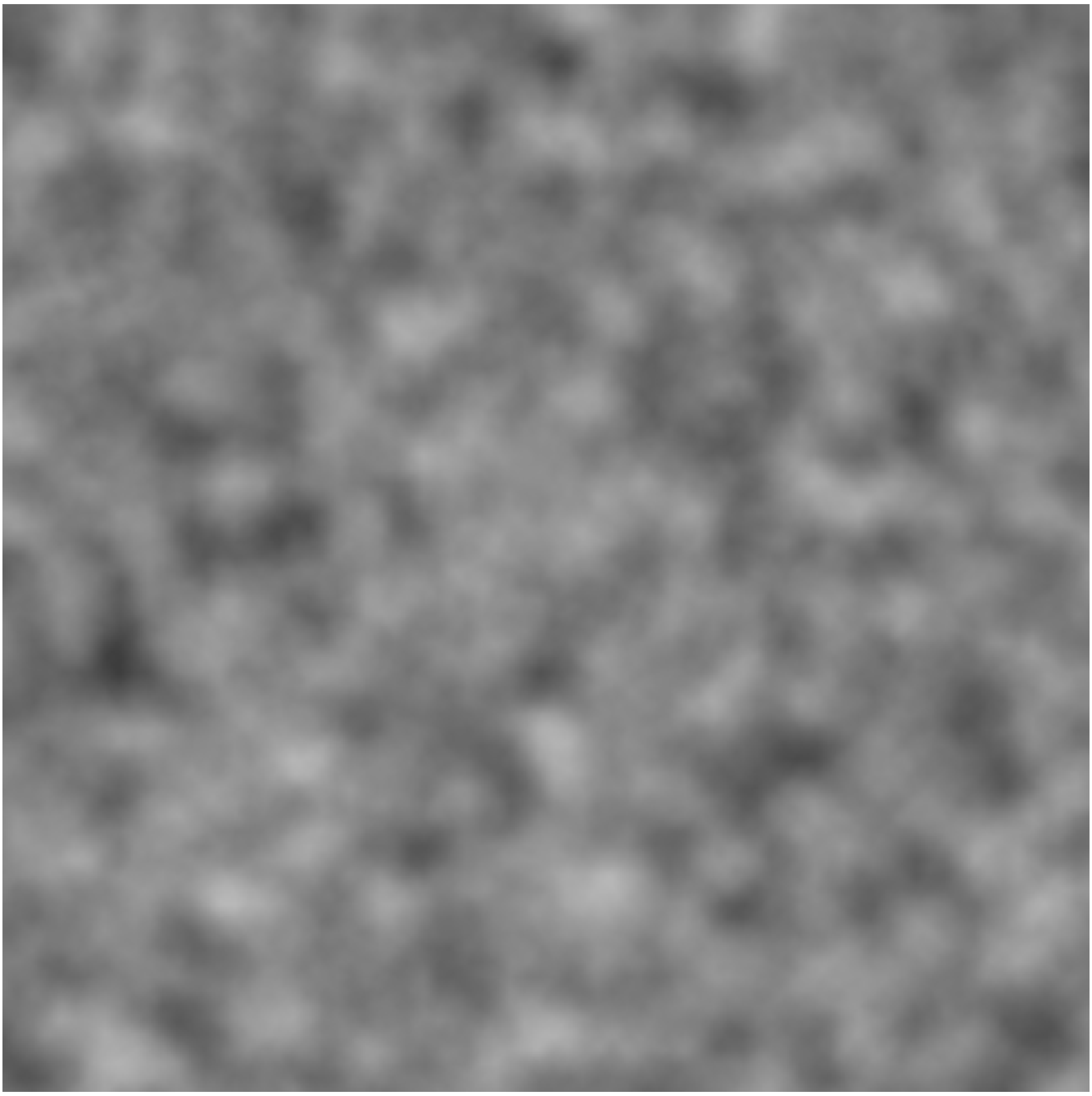
previous work: breadquest, by ostracod

Basic technique but only in math



this basic technique has directional artifacts, which should hopefull be visible in the image above.

it’s mostly a weighted average of points-on-a-grid around the point you want

this algorithm has a few parameters:

- an infinite grid/lattice of points (here, i assume a square grid where L is the distance between adjacent points)
- a function that i will call a weight function. this function $w : \mathbb{R}^2 \to [0, \infty)$ should be 0 when either input argument is too big (about $2L$ or $3L$ away from 0).

the algorithm $f(x, y)$ is as follows:

assign each point p on a grid a random value p_v.

for each point p on the grid, calculate $w(x - p_x, y - p_y)$, and obtain p_v.

sum them all up, so you have:

$$V = \sum w(x - p_x, y - p_y) p_v$$

$$W = \sum w(x - p_x, y - p_y)$$

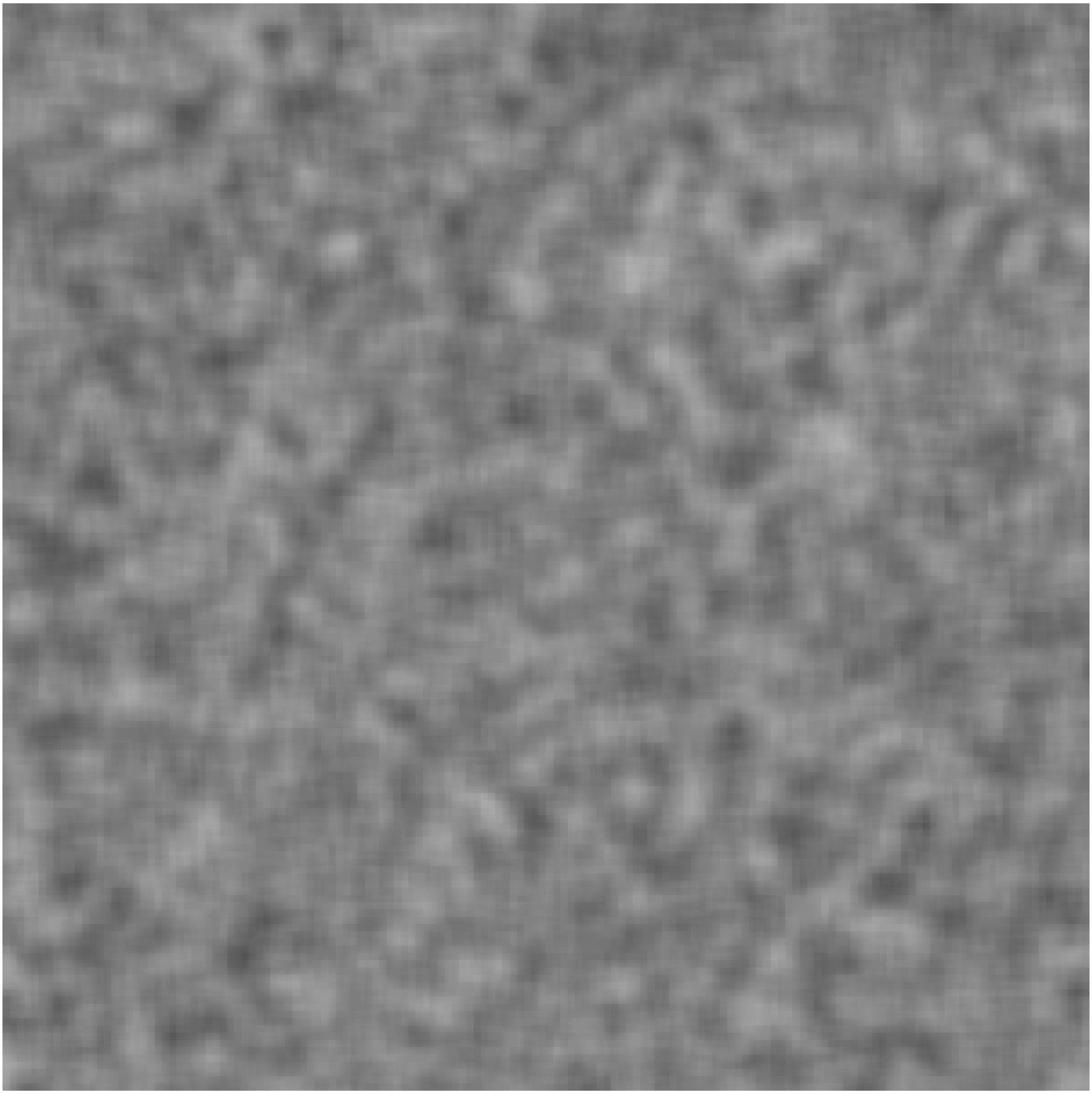
$$f(x, y) = \frac{V}{W}$$

Applying it to computer

i specified an infinite grid, but computers don't do infinite grids generally, but you don't have to care about most of the points because the weight function should be 0 far away from each point

you can just get rid of all the points whose weight function would be greater than 0 by like, just considering the grid points in a square (or smth) around your input point

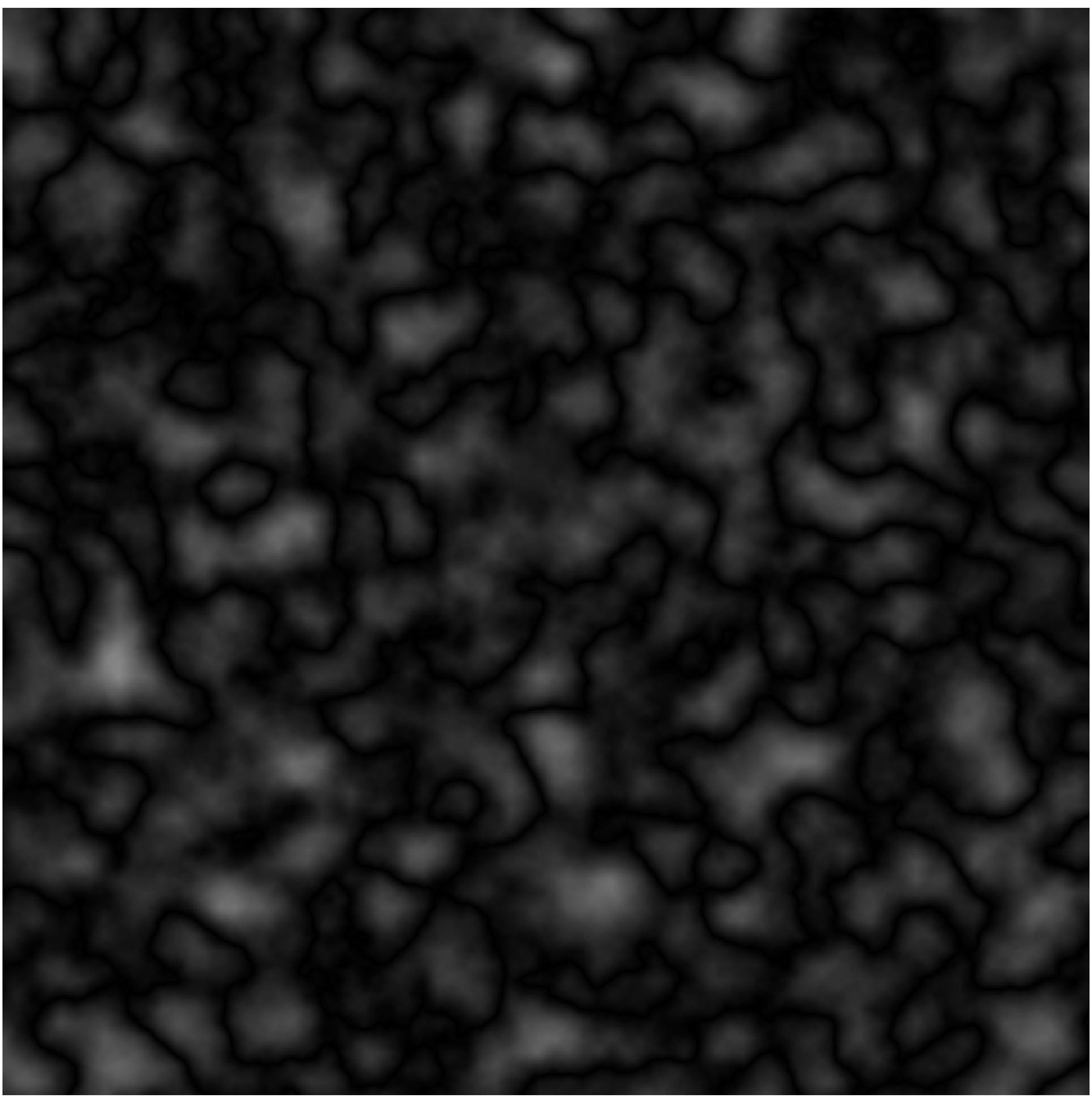
however, if you get rid of too many points, you could get artifacting like this:



the artifacts in that image are horizontal and vertical.

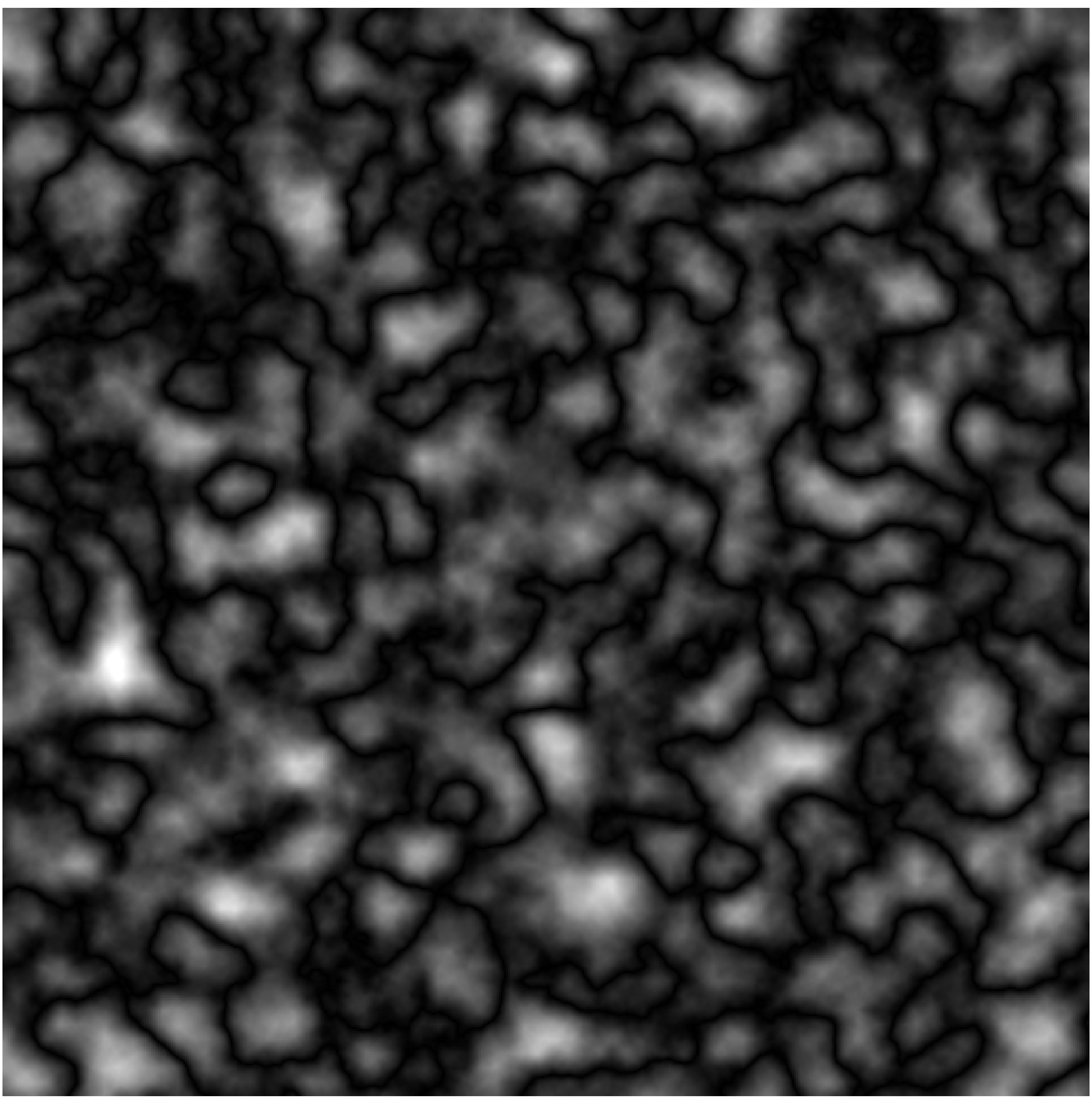
what you can do with noise

consider the first image. the p_v values are all on $[0, 1]$, so the midpoint is 0.5. here is $2 \cdot |0.5 - f(x, y)|$:

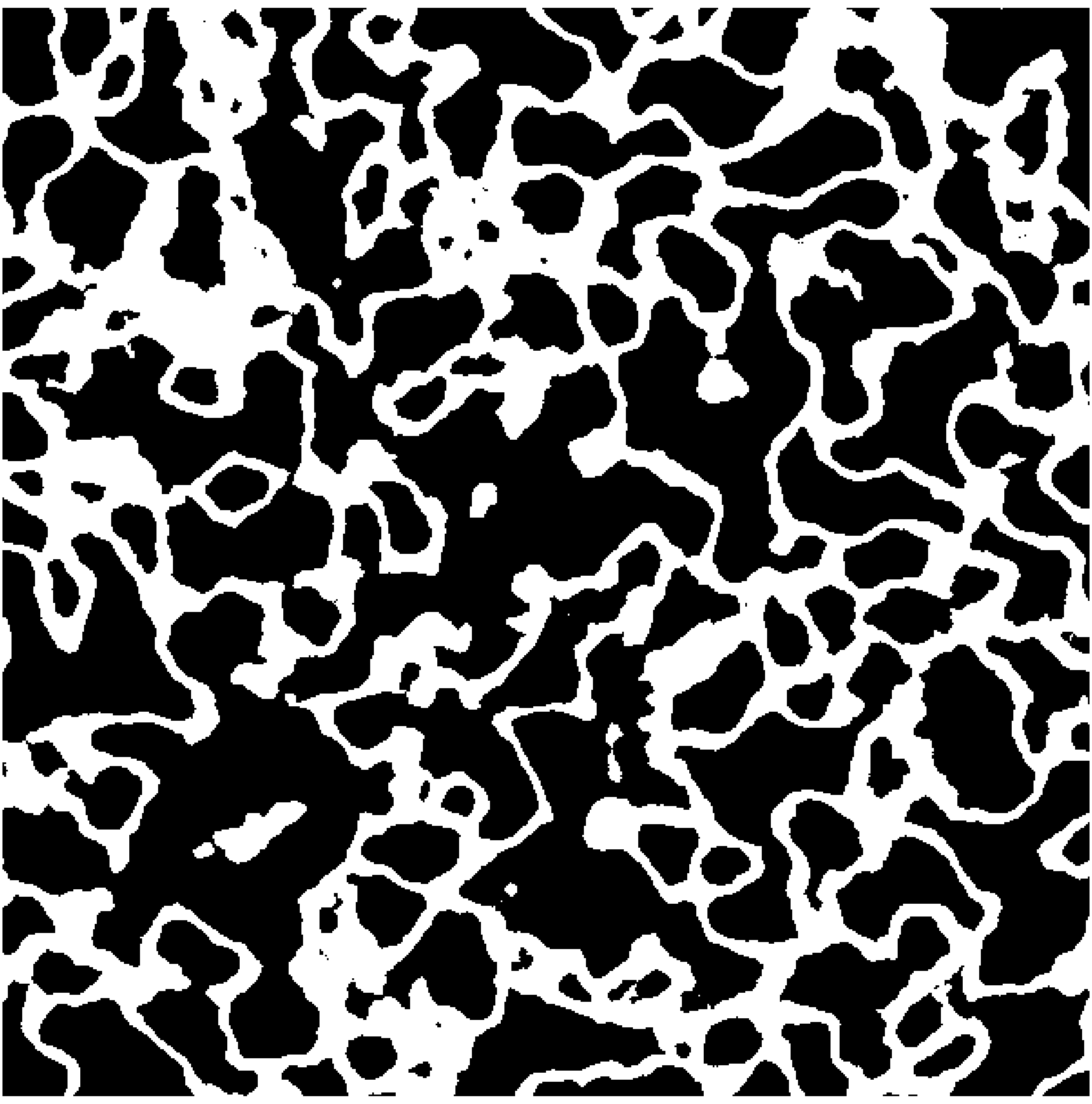


here, there are kind of valleys where the f was close to 0.5.

here is the image brighter:

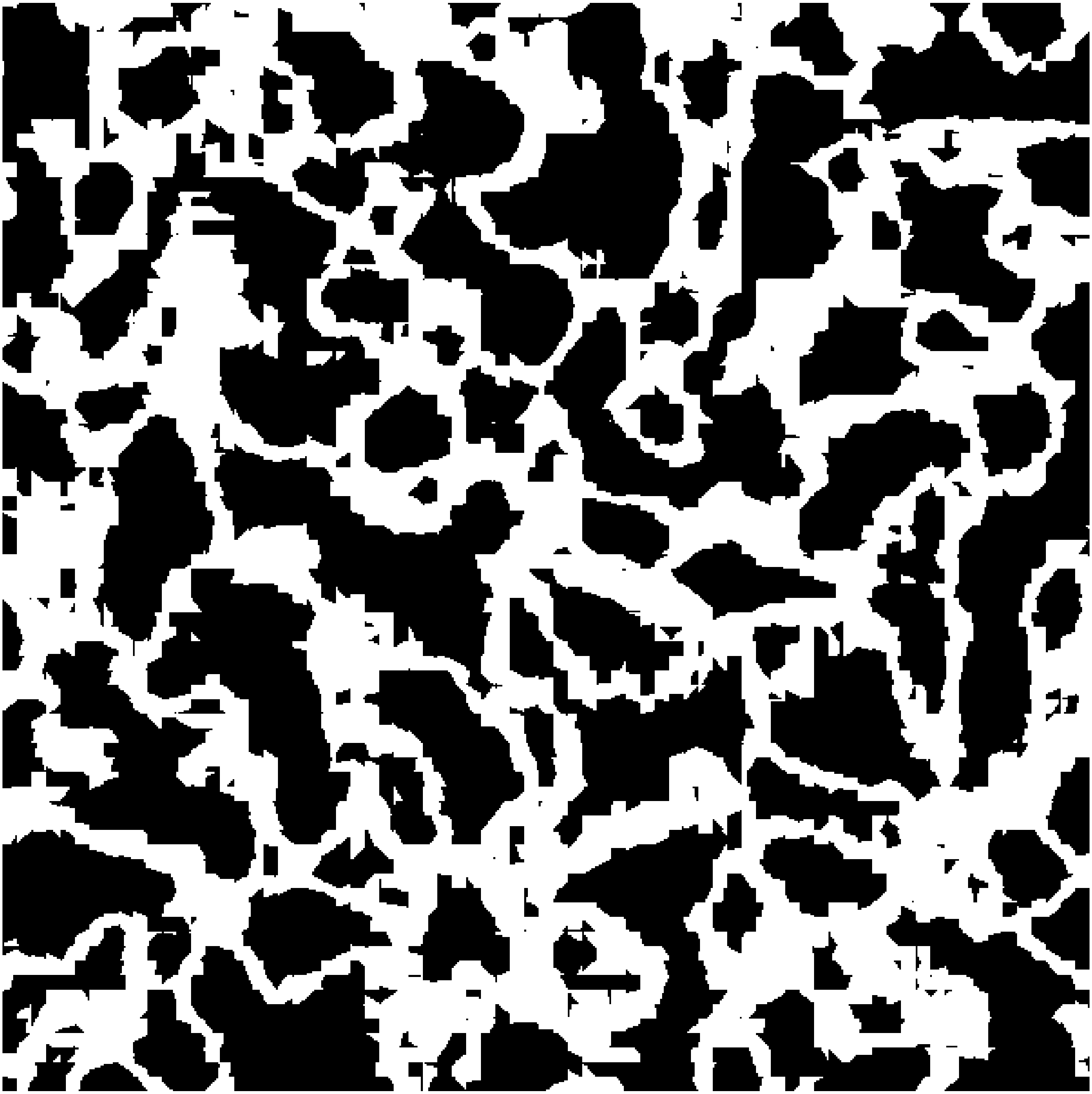


and here is a thing that's white iff f is close to between 0.46 and 0.54:



reintroduction of artifacts

sometimes, you might want to forget about points whose weights are nonzero for glitchy aesthetic



how this relates to breadquest

breadquest does this kind of noise, but calculates it in a very cool way using a specific weight function for which V always ends up being 1.